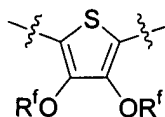


What is claimed is:

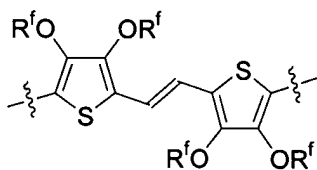
1. A nonlinear optical chromophore having the formula D- π -A, wherein: π is a π bridge including a thiophene ring having oxygen atoms bonded directly to the 3 and 4 positions of the thiophene ring; D is a donor; A is an acceptor; and the oxygen atoms are further substituted with a fluorinated group comprising at least three fluorines.

2. The nonlinear optical chromophore of Claim 1, wherein π comprises:



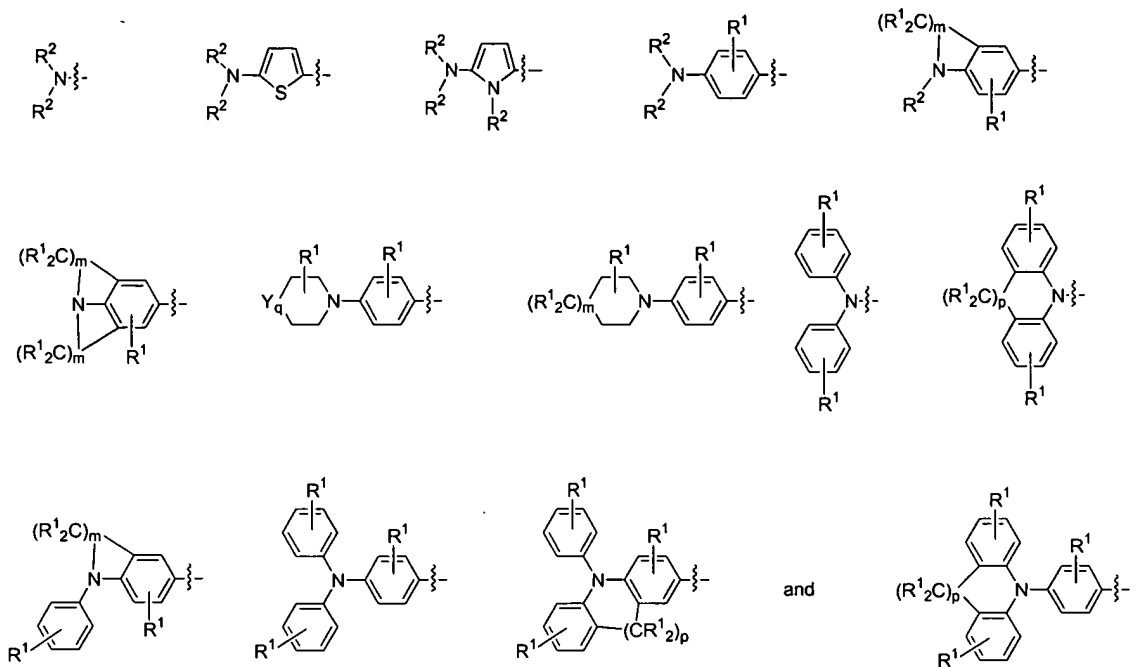
wherein independently at each occurrence R^f is a fluorinated group comprising at least three fluorines.

3. The nonlinear optical chromophore of Claim 2, wherein π comprises:

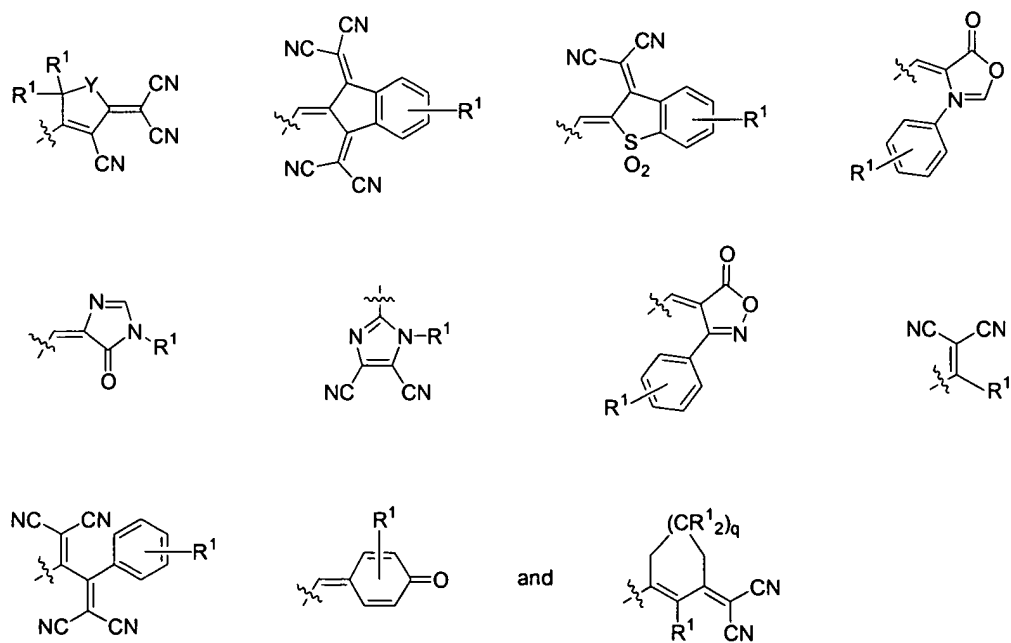


wherein independently at each occurrence R^f is a fluorinated group comprising at least three fluorine atoms.

4. The nonlinear optical chromophore of Claim 1 wherein the donor is selected from the group consisting of:

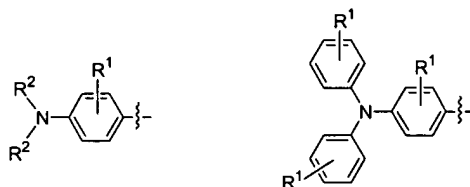


and the acceptor is selected from the group consisting of



wherein independently at each occurrence: R^1 is hydrogen, a halogen except when bonded to a carbon alpha to or directly to a nitrogen, oxygen, or sulfur atom, or an alkyl, aryl, heteroalkyl, or heteroaryl group; R^2 is hydrogen or an alkyl, aryl, heteroalkyl, or heteroaryl group; Y is O, S or Se; m is 2, 3 or 4; p is 0, 1 or 2; and q is 0 or 1.

5. The chromophore of Claim 4, wherein the donor is selected from the group consisting of



wherein, independently at each occurrence: R^1 is hydrogen, a halogen except when bonded to a carbon alpha to or directly to a nitrogen, oxygen, or sulfur atom, or an alkyl, aryl, heteroalkyl, or heteroaryl group; and R^2 is hydrogen or an alkyl, aryl, heteroalkyl, or heteroaryl group.

6. The chromophore of Claim 1 wherein the fluorinated group is selected from the group consisting of 2,2,2-trifluoroethyl; 2,2,3,3,3-pentafluoropropyl; 2,2,3,3,4,4,4-heptafluorobutyl; 2,2,3,3,4,4,5,5,5-octafluoropentyl; 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluoro-1-octyl; 2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-pentadecafluorooctyl; 1-trifluoromethyl-2,2,2-trifluoroethyl; 1-trifluoromethyl-2,2,3,3,3-pentafluoropropyl; 2,3,4,5,6-pentafluorobenzyl; and (2,3,4,5,6-pentafluorophenyl)ethyl.

7. The chromophore of Claim 1, wherein the fluorinated group has the formula $-(CH_2)_t(CF_2)_vF$ or $-(CH_2)_t(CF_2)_wH$, where $t = 1$ to 5, $v = 1$ to 20, and $W = 2$ to 20.

8. A second order nonlinear optical composition comprising a polymer matrix and the chromophore of Claim 1.

9. The composition of Claim 8, wherein the polymer matrix is crosslinked.

10. The composition of Claim 8, wherein the chromophore is covalently incorporated into the polymer matrix.

- 1 11. The composition of Claim 10, wherein the polymer matrix is crosslinked.
- 1 12. The composition of Claim 8, wherein the polymer matrix is fluorinated.
- 1 13. An electro-optic device, comprising the second order nonlinear optical composition of Claim
2 8.
- 1 14. The electro-optic device of Claim 13, wherein the electro-optic device is selected from the
2 group consisting of an optical modulator, an optical switch, and an optical directional
3 coupler.
- 1 15. The electro-optic device of Claim 13, comprising: 1) an input waveguide; 2) an output
2 waveguide; 3) a first leg having a first end and a second end, the first leg being coupled to the
3 input waveguide at the first end and to the output waveguide at the second end; and 4) and a
4 second leg having a first end and a second end, the second leg being coupled to the input
5 waveguide at the first end and to the output waveguide at the second end.
- 1 16. The electro-optic device of Claim 13, comprising: 1) an input; 2) an output; 3) a first
2 waveguide extending between the input and output; and 4) a second waveguide aligned to the
3 first waveguide and positioned for evanescent coupling to the first waveguide.
- 1 17. An optical router including the electro-optic device of Claim 13.
- 1 18. A communications system including at least one electro-optic device of Claim 13.
- 1 19. A method of data transmission comprising transmitting light through the composition of
2 Claim 8.
- 1 20. A method of telecommunication comprising transmitting light through the composition of
2 Claim 8.
- 1 21. A method of transmitting light comprising directing light through or via the composition of
2 Claim 8.

- 1 22. A method of routing light through an optical system comprising transmitting light through or
2 via the composition of Claim 8.
- 1 23. A phased array radar system comprising the composition of Claim 8.